



**Towards cooperation between European start ups: The position of
the French, Dutch, and German entrepreneurial and innovative
engineer**

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Towards cooperation between European start ups: The position of the French, Dutch, and German entrepreneurial and innovative engineer

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Abstract

People who want to start their own business often try to survive or to die again on their own. The very fact that "others", apart from family, friends and fools who invest in their venture, are quickly seen as probable competitors, who want to steal the idea, prevent start ups from cooperation with partners. Setting up a personal network might even cause more risk, since one has to share ideas for technological development of the idea or look for a market for it. The consequence is that within 5 years most new start ups are already out of business (OECD, 1998). The key would be cooperation with others, but with whom and to what extent? Since most of the engineers know that they to develop an innovation, they might need up to a whole R&D lab to help, they might be less reluctant to cooperate than others. On the other hand, they might forget to look for a market or cooperate with a potential customer to design the product, for instance in the ICT-sector (see Van Luxemburg et al.), because of a technology push syndrome?

Authors, such as Birley (Several publications from 1985 on) have not failed during the last ten years to develop the idea of and study the effect of networking and strategic alliancing between start ups, entrepreneurship as team work and at least a shared concept for starters who have the same objective in mind. University incubators, such as the one of the Imperial College in London are very successful in promoting the idea (see Theunissen, 2002), but is this the case only in the UK or the US, where the culture of free enterprise is more strongly developed? What about countries, such as France, The Netherlands, and Germany? What is the position, for instance of the entrepreneurial and innovative engineer who wants to start his/her own business? May a lack or a fear to cooperate with others be a result of how engineers traditionally educated in those countries? In 1998 Albert Rubinstein identified "technical entrepreneurship in the firm" as the focus of the future of our intellectual discourse on technology and innovation management. How entrepreneurial are French, German and Dutch engineers and what is their innovation culture and that of the firms they work for? Are those who are leaving those firms to start their own business, willing to cooperate with others, not to fade away in splendid isolation?

This chapter certainly cannot answer all those questions, but it can try to develop a model of the entrepreneurial and innovative European engineer and his/her interaction with the environment through networks and cooperation illustrated with examples from the selected countries. This is backed up with some answers to 8 research questions related to data about the general economic environment the entrepreneur works in, the rate and difficulty of self-employment, such as the costs, satisfaction levels, and the possible effect of national culture on willingness to start and the profile traits of the

successful innovator and entrepreneur from different empirical sources for France, The Netherlands and Germany. Cooperation between start ups in Europe is certainly not a question of only national culture, a merge or a clash between professional and corporate cultures might foster or hamper as well. Entrepreneurial and innovative engineers build up their experiences of such kind through life time. This chapter is based upon data from 3 different European countries which includes a survey among French engineers (questionnaires and interviews from entrepreneur and non entrepreneur engineers) and a case comparison of 12 innovative German and Dutch firms. How does this transition take place in different parts of Europe? How may engineers become successful entrepreneurs through a happy reconciliation of technological and marketing orientations within a given historical context.

Finally this chapter addresses the question how to foster cooperation between European start ups for a better enterprising and innovative culture. Research projects aiming at this issue, might start as comparing national entrepreneurship phenomena, such as suggested partly by Lichtenberger and Naulleau (1993) and Trompenaars and Hampden-Turner (1999), followed by studying cooperation, networks and alliances (Aliouat, 2000) including globalisation (Birley and Stockley, 1998) and the heterogeneity of teams, for instance by mixing marketers and engineers (Bantel and Jackson, 1989, Geletkanycz and Hambrick, 1997, and Shaw and Shaw, 1998). Cooperation requires more mobility. Within the European Union, the individual member states face rather an influx of economic refugees (who might create excellent start ups, by the way) than that they can welcome an invasion of entrepreneurial and innovative engineers from another member state. Which French engineer would like to start a business with a German colleague who could implement his idea perfectly? Which German engineer seeks a market-oriented partner in Britain or The Netherlands to fulfill his dream of a successful start up? Which Dutch engineer looks for technology entrepreneurship in France and vice versa? It seems as if new virtual borders prevent start ups also to cooperate. That why this chapter presents a summarizing model of a new cultural identity of Europe based upon Entrepreneurship, Innovation and Mobility using the onion culture metaphor by Hofstede and Schein (both 1991) to increase the mobility of the European engineer (Ulijn and Gould, 2002). A new culture is needed to foster the cooperation between high, low and other tech start ups to facilitate a truly European technology entrepreneurship.

1. Introduction

People who want to start their own business often try to survive or die again on their own. The very fact that "others", apart from family, friends and fools who invest in their venture, are quickly seen as probable competitors, who want to steal the idea, prevent start ups from cooperation with partners. Setting up a personal network might even cause more risk, since one has to share ideas for technological development of the idea or look for a market for it. The consequence is that within 5 years most new start ups are already out of business (OECD, 1998). The key would be cooperation with others, but with whom and to what extent? Since most of the engineers know that to develop an innovation, they might need up to a whole R&D lab to help, they might be less reluctant to cooperate than others. On the other hand, they might forget to look for a market or cooperate with a potential customer to design the product, for instance in the ICT-sector (see Van Luxemburg et al.), because of a technology push syndrome?

Authors, such as Birley (several publications from 1985 on) and Aldrich and Zimmer (1986) have not failed during the last ten years to develop the idea of and study the effect of networking and strategic alliancing between start ups, entrepreneurship as team work and at least a shared concept for starters who have the same objective in mind. University incubators, such as the one of the Imperial College in London are very successful in promoting this concept (see Theunissen, 2002), but is this the case only in the UK or the US, where the culture of free enterprise is more strongly developed? What about countries, such as France, The Netherlands, and Germany? What is the position, for instance of the entrepreneurial and innovative engineer who wants to start his/her own business? May a lack or a fear to cooperate with others be a result of how engineers traditionally educated in those countries? In 1998 Albert Rubinstein identified Technical entrepreneurship in the firm as the focus of the future of our intellectual discourse on technology and innovation management. How entrepreneurial are French, German and Dutch engineers and what is their innovation culture and that of the firms where they work? Are those who are leaving those firms to start their own business, willing to cooperate with others, not to fade away in splendid isolation?

To tackle those questions a few definitions are needed with some international scope. In their strategic definition Hitt and Reed (2000) link entrepreneurship to innovation right away:

"Entrepreneurship is a way of thinking and doing things that transforms innovation into market opportunities or competitive advantage".

Who is an entrepreneur? Kao (1997) defines as follows:

"An entrepreneur is a person who undertakes a wealth-creating and value adding process, through incubating ideas, assembling resources and making things happen".

Several authors since Schumpeter (1934), have underlined a definition of innovation should always imply an entrepreneurial mind set: an innovation has to be implemented to lead to a marketable product, an entrepreneur is a person of ideas and actions who looks constantly for new product and market opportunities (see Drucker, 1985, Mueller

and Thomas, 2000, the authors they cite and Ulijn and Weggeman, 2001, the latter more for relation between innovation and culture as a mind set). We might summarize the definitions of innovation mentioned in those sources as follows:

"Innovating is a group process that is characterised by its multidisciplinary character and its (limited) controlability, and this process leads to an innovation, which is a new product, process or service or a part of those".

This one indicates well the cooperation element of this process, which is also materialised in the concept of *international* entrepreneurship, although this is still too much seen as doing things abroad in marketing terms (see the literature cited by Kandasaami and Wood, 1996), thank thinking and innovating through networking or strategic alliancing. The impressive comparison of 18 multinational corporation (MNC) cases of global innovation (6 in any of the following sectors each: pharmaceutical, chemical and food, the electronics and software industry, and the electrical and machinery industry), with DuPont, Canon, and ABB as best in class in each sector by Boutellier et al. (1999) might lead to recommendations to intrapreneurship within those firms, but is not linked to spawned out start ups as a result of that innovation management process. We all are aware, of course, that MNCs in crisis often lead to the birth of numerous start ups, as the Eindhoven area in The Netherlands in the nineties of the last century has shown. The ASML company, as a spin out of the Philips R&D labs with its chip making equipment is just one of them. Although some small firms might be dependent only on an international market, the very start of small business development might be too often a strict national, regional, or even individual affair. (International) cooperation seems not be on the agenda of the would be entrepreneur. A missed opportunity? What is his or her position, for instance on the European scene?

2. A model of the entrepreneurial and innovative European engineer and his/her interaction with the environment: networks and cooperation

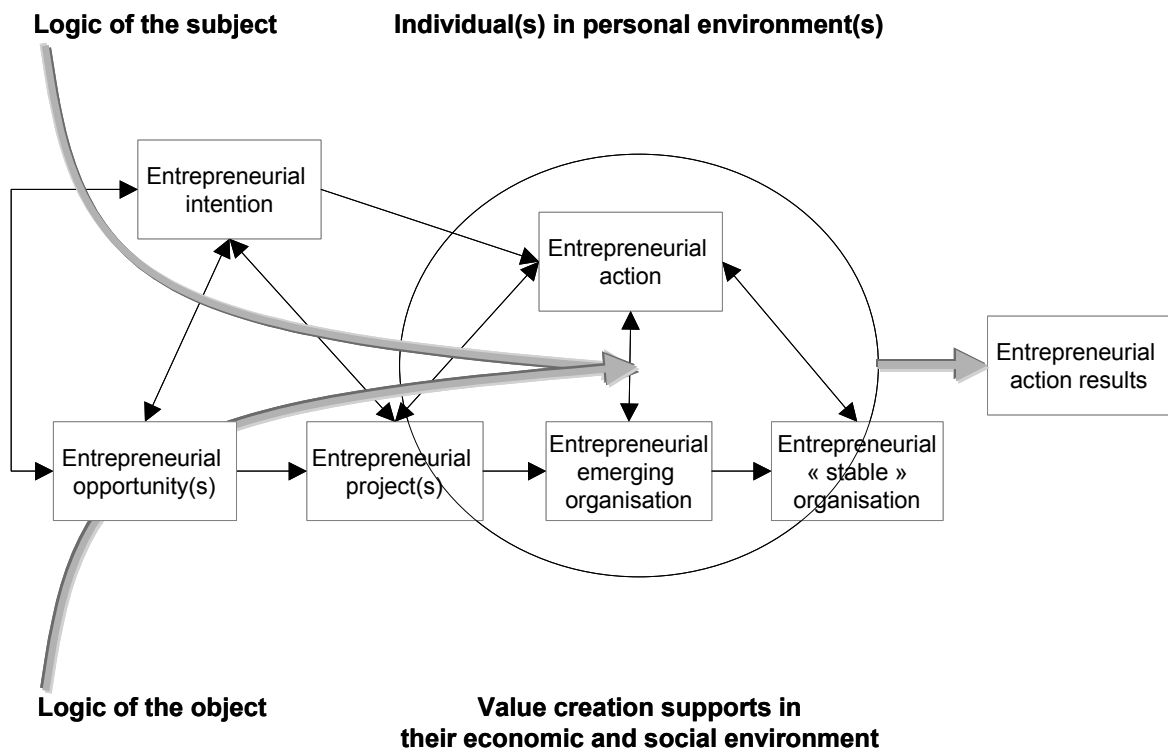
Entrepreneurship theory, as summarized by Kandasaami and Wood (op. cit.) encompasses a broad range of perspectives: socio-cultural, population ecological, economic, psychological and last but not least, as discussed above: international. Those perspectives all affect the personal environment of the technology entrepreneur in his/her start up. S/he, therefore, needs to have a global vision, pioneering-innovative motive, networking skills, trustworthiness, tolerance for cultural differences, tolerance for ambiguity and locus of control. To cooperate entrepreneurs need to have access all those characteristics, because who can master this all as an individual? On the other hand, as the study by Paffen (1998) on career paths by Dutch engineers towards general management shows that those can be signposted by experiential, evolutionary and transdisciplinary and for cooperation above all interactive aspects. In the career from technical professional, via line manager and division director to top manager management, entrepreneurship and leadership (in this time line) are important steps in his personal development (p. 317). One of the recommendations is: *Think as an entrepreneur* (or intrapreneur within a firm). Interaction is key also in entrepreneurship, as the French study by Fayolle (1995 and 1996) pinpoints. How can cooperation create value for the technology entrepreneur to support his/her personal, economic and social environment? This chapter cannot answer all the above questions with respect to entrepreneurship and cooperation, but we can try to develop a model of the

entrepreneurial and innovative European engineer and his/her interaction with the environment (see next section) through networks and cooperation illustrated with examples from countries, such as France, The Netherlands and Germany.

2.1 Presentation of our model

Below Fig. 1 shows an interactive model of the entrepreneurial and innovative engineer in his/her personal (and also professional) environment.

Fig.1 : The entrepreneurial and innovative engineer in his/her personal environment



In the above model which comes from a previous study (Fayolle, 2002), two logics meet within a process where interaction is a key element.

The first logic (logic of the subject) concerns the individual, in our perspective the engineer. The engineer, any engineer, is, in a certain way an entrepreneur who is not necessarily aware of it, and whose personal and professional life is made up of a variety of different stages. The first stage, at which the engineer can remain all his life, is characterized by an indifference towards (or unawareness of) entrepreneurship. Any engineer can, according to influences through interactions, develop a taste for entrepreneurship which we define as an inclination, a desire to begin an entrepreneurial process. An engineer who shows entrepreneurial inclination is someone who is aware of, or sensitive to, entrepreneurship as we can observe in a study on the entrepreneurial behaviors of the French engineers by one of us (Fayolle, 1996). This propensity can develop towards an entrepreneurial intention. For many years, the theory of planned behavior, initially proposed by Ajzen (1991), has been used to model entrepreneurial intention (Krueger and Carsrud, 1993; Kolvereid, 1996; Autio et al., 1997; Tkachev and

Kolvereid, 1999). This, and other theories, come from the fields of sociology and psychology. The intention often, but not always, precedes entrepreneurial behavior which suggests both a decision to act, and an involvement in entrepreneurial action. The final stage is the appraisal (advantages and benefits at an individual level) of the results of the entrepreneurial action.

In this progression, each engineer can acquire and develop entrepreneurial potential, defined as a collection of personal resources (knowledge, experience, skills, relations, networks,...) which are useful for entrepreneurial action. The path which leads an engineer to setting up a business is strongly influenced by his initial training, by the social status of the school from which s/he graduated, by the professional experience which s/he has acquired, by the technical skills which s/he has developed, and by some personal factors. This path leads to very contrasting entrepreneurial profiles, as we have seen in a previous work (Fayolle, Ulijn and Nagel, 2002).

The second logic (logic of the object), we are showing in our model, concerns the creation of value, or rather the intangible and/or tangible support for the creation of value and the notions which are used to describe it. This support has varying value creating potential which can be freed and expressed under certain conditions.

If we look at this second logic, the first step is probably the entrepreneurial first idea (not mentioned in Fig. 1) which an engineer can have and which can turn out to be an entrepreneurial opportunity following a study of the environment in question and an initial assessment of possibilities. Following the opportunity, the entrepreneurial project begins to take shape, get a structure and possibly become the object of material formalization. The fact of using concepts of opportunity and project means there will be interaction, transactions and co-operations with the environments and professional and/or personal milieu. The importance of these relations is probably in relation with the intensity and the level of technological innovation in the entrepreneurial project (Mustar, 1997). The next stage corresponds to the emergence of the entrepreneurial organization. Imagined, visualized, formalized, and proportioned in the project stage, it will come in existence at the launching time. The final stage is the creation of a “stable” entrepreneurial organization or a new firm which can be assessed using business performance and results indicators.

In this second logic, each stage contains a varying potential for the creation of value which depends on the quality of the observations, the entrepreneurial orientation, the marketing orientation, the processing of information, the quality of environment interactions and, finally, the aptness of the choices made by the engineer within his/her process. However, the “real” creation of value only happens at the end of the process and this raises the question of the best transformation of a given potential of value creation through an organizational set up, a level of resources and strategic moves and decisions.

The main interest of our model is to suggest that even if it is necessary to take into consideration each of these two logics, this one of the entrepreneurial and innovative engineer and this one of the value creation material, the best way to develop a comprehensive view of this phenomenon is to analyze the engineer-value creation material couple in a more systemic approach. On the one hand, the entrepreneur engineer profile influences the entrepreneurial action results and on the other hand, the

nature of the entrepreneurial opportunity or the characteristics of the entrepreneurial project influences and probably changes the initial orientation of the entrepreneurial engineer. One of the stronger consequences of this could be seen by discovering the entrepreneurial behavior differences of two contrasted profiles of entrepreneur engineers, those who are technology oriented and those who are management and/or market oriented (Fayolle, 2001). Only to give, here, few insights, the former is launching industrial activities, developing new technologies, innovating in technologies, using technological networks, choosing partners and associates among engineers and scientists; the later is launching a wider range of activities, innovating in product and service areas, choosing managers and not engineers as partners or associates, financing his/her enterprise through external sources, and developing the firm using a strong growth orientation.

Needless to say that this model of technology entrepreneurship which reflects the evolution of the engineer combined with a cubical action model with on one face opportunity identification and implementation, a second face with profit seeking, organizing, creating and innovating with skills required, such motivation and finance on a third face is affected by the personal characteristics, such: country, age, gender (see authors, as Shane and Stevens quoted by Brown and Ulijn, this book and Mueller and Thomas, op. cit.), and education (Reynolds et al., 2000).

2.2 Comparison elements between French, Dutch and German entrepreneurship

Fig. 1 has linked the environment of the person of the entrepreneurial and innovative engineer with her/his enterprise, be it high, low or any tech. We deal with technology entrepreneurship at all levels. Table 1 will now present some answers to 8 research questions related to data about the general economic environment the entrepreneur works in, the rate and difficulty of self-employment, such as the costs, satisfaction levels, and the possible effect of national culture on willingness to start and the profile traits of the successful innovator and entrepreneur from different empirical sources for France, The Netherlands and Germany.

Below, the answers to the following Research Questions (RQs) will be dealt with, concluded by a comparison between the 3 countries in general.

- 1. How productive are French, Dutch and Germans?*
- 2. What is the relation between Employment (E) and Labour productivity (LP)?*
- 3. How many people are self-employed (% of total workforce)*
- 4. How difficult is it to start a business?*
- 5. What are the approximate average initial costs to set up a private limited company?*
- 6. How satisfied are those self-employed vs those employed?*
- 7. What is the possible relation between national culture and entrepreneurship?*
- 8. What is the ideal profile of the innovative entrepreneur?*

Table 1 Comparative table of research outcomes about French, Dutch and German entrepreneurship and entrepreneurship in general

Table 1: Comparative table of Research outcomes about French, Dutch and German entrepreneurship and entrepreneurship in general							
Research Question (RQ)	Source		French	Dutch	German		Remarks
1. How productive are French, Dutch and Germans (GDP per capita) ?	OECD (2000)		64	77	68		US = 100, Jap = 71, EU = 65
2. What is the relation between employment (E) and Labour productivity (LP) (1995 – 2001) ?	OECD (2000)	LP	All close to average				US: LP > average
		E	Close to avarage, as US	> average	< average, as Japan		
3. How many people are self-employed (% of total workforce) (1974 – 1994) ?	Hofstede et al, this issue		9.5	8.7	6.8		Only West-Germany
4. How difficult is it to start a business (% of respondents) ?	Eurobarometer Survey (2000)		26	35	29		EU: 29
			Max: 100 = very easy			US: 26	
5. What are the approximate average initial costs to set up a private limited company?	Benchmarking EU (2002)		€ 200	€ 800	€ 700		Highest: Austria, € 2,200
						Lowest: Denmark, € 0	
6. How satisfied are those self-employed (% of respondents)?	Blanchflower et al. (2001), Eurobarometer (1995)				West	East	
		Fairly	61	47	52	57	
		Very	20	44	32	33	
What about the employed?		Fairly	53	39	40	50	
		Very	28	59	49	41	

7. What is the possible relation between national Culture and entrepreneurship? (maximum score of Hofstede: 100)	Hofstede et al, this issue. Hofstede (2001)					Ideal:	Nakata and Sivakumar (1996), Weggeman and Ulijn (2001)
		Power Distance	68	35	38	Low	
		Individualism	71	67	80	High	
		Masculinity	43	66	14	Low	
		Uncertainty Avoidance	86	65	53	Low	
	Barnes (2000), Harris and Moran (1996)		Bureaucratic, as Japan	Managerial as US	Technical		
8. What is the ideal profile of the innovative entrepreneur?	Trompenaars and Hampden-Turner (1999)					Ideal order suggested by the Top Management	
						Team of Shell:	
			I	R	L	H	
			A	A	A	A	
			L	H	R	I	
			H	L	I	R	
			R	I	H	L	
			Key: decreasing order of priority of Analysis (A), Helicopter view (H), Imagination and Creativity (I), Leadership (L), Reality (R) (given in alphabetical order)				

Note: Italicised numbers are percentages

One question is lacking: Is there a strong relation between innovation and employment as well, as Schumpeter already suggested. Jaffe (1989) demonstrates for 29 American states over 8 years a link of both with investment in R&D and patents, although in the EU member states employment was negatively correlated with patent activity (Laafia, 2001). We do not have the United States of Europe yet, in the EU other factors might affect that link, such as a different role of the national governments in this process. The Dutch government does not mingle too much with the national economy affairs, spend less on R&D and education, whereas the French and the German ones do a lot more and protect their much bigger domestic markets.

Compared to the US (100), the Dutch are per capita (77) more productive than the EU average (65) and that of Japan (71) and this leads to an employment rate above average. Germany (and Japan) on the other side have an employment below average. France and the US are close to average in this respect, but in the US this might be explained partly by a higher labour productivity (we are dealing with correlation coefficients which do not predict causal relationships). Although the periods compared do not match (1995-2001 vs 1974-1994), it seems that the Eurobarometer 2000 index finding that in the US 69% of the population would prefer to be self-employed vs 51% in the EU, might partly account for the 9.9% self-employed of the total workforce in the reality of the previous period of 1974-1994 (Japan: 11.2%). Notwithstanding (or because of, to oppose it, in France?) the bureaucratic culture of both France and Japan (see RQ 7), those countries have a higher self-employment rate (9.5% and 11.2%) than the Netherlands (8.7%) and Germany (6.8%).

We come now to a number of RQs related to the personal situation and satisfaction of the self-employed and to a possible national culture effect on entrepreneurship and entrepreneur. In all countries compared starting your own business is perceived as rather difficult, but in the Netherlands less so than in the EU in general (35 out of 100 vs 29/100). Even Americans find it not so easy to start their own business (26)! The low cost of setting up a business in France (€ 200) might explain partly the higher percentage of self-employed, but for Dutch and German entrepreneurs it would not do so (€ 800 and 700, but a higher self-employment rate in the Netherlands). The same holds true for Austria and Denmark, which are the extremes in cost (€ 2200 vs zero), but a representative sample from the population in both countries both prefer the employment and not the self-employed status (57 and 55%, Eurobarometer 2000). Denmark seem to have a unique position where with low cost to start a business people still prefer to have a boss! More than 80% of the 8.000 people questioned in the US and the EU (Eurobarometer 2000) believe that inadequate financial support makes it difficult to start a business. Another striking finding from this last survey, is that the Dutch would prefer to be employed (58%, whereas French prefer the opposite (55%), which is in line with a higher self-employment. In Germany the preference is slightly over to self-employment (East and West together, 48 vs 46%). With a preference of 51% to be self-employed the whole of the EU scores clearly lower than the Americans (69%). How satisfied are those self-employed vs those employed (RQ 6)? The Dutch are the most happy people here with both as self-employed and employed, but yet more so with the latter one (44 and 59% high satisfaction). Then comes Germany (West: 49 and 32%), whereas the French and the Eastern Germans were the most unhappy in 1995 on this point. Combined with the RQ 3 one may conclude, as Hofstede et al., this issue indicates in much more detail, that dissatisfaction might also explain partly a higher

preference to be self employed (Eurobarometer, 2000) and a higher self-employment rate (RQ 3).

What is the possible relation between National Culture (NC) and innovation/entrepreneurship (RQ 7)? We have to refer here again to Hofstede et al., this issue, but can look more in detail to the countries of comparison selected. Nakata and Sivakumar (1996) and Ulijn and Weggeman (2001) could evidence on the basis of their empirical studies that ideally innovation in its initiation stage would require low power distance, masculinity and uncertainty avoidance and a high individualism in companies for entrepreneurship to emerge (intrapreneurship inside). The Dutch NC would then be ideal, with the German next and the French in the last position, but for the implementation of the innovation a high power distance, masculinity, and uncertainty avoidance and a low individualism would work better. On those scores the ideal order would be the opposite: France, Germany, The Netherlands. If we make a plea in this chapter for more cooperation and teamwork which is particular required to make the start up really a success in the long run, the 3 countries combined would warrant an ideal European start up! It is not sure if the characterization by Harris and Moran (1996) of the working cultures in some countries would work in a comparable way to the (dis)advantage of entrepreneurship development. In Japan and France bureaucratic culture might lead to high employment rates, as said above, but the Dutch managerial culture seems to lead to a lot less willingness to start your own business (41%) than the US one (69%, Eurobarometer 2000). Finally, regarding the ideal profile of the innovative entrepreneur (RQ 8) the 3 countries might cooperate again in a complementary way. All agree on analysis as a sound base of technology entrepreneurship in the second place, but the French give priority to imagination and creativity, the Dutch are realistic and the Germans need some leadership in an entrepreneurial team (this finding by Trompenaars and Hampden-Turner (op. cit.) for Shell have been confirmed by later findings for students, business executives and experts (Klafft and Daum, 2001, Ulijn and Fayolle, in prep and below). In sum the 3 countries are not too far apart when it comes to the position of being an entrepreneur. Some differences might be mutually supportive, when it comes to cooperation between start ups. Across the EU it is striking, however that most countries in Northern Europe (including the Benelux) prefer the employed status with the exception of Ireland, which together with the Southern/Latin countries prefer to be self-employed. This finding and that of France contradicts the recent survey by Reynolds et al. (2000), where Ireland and France present only 2 to 3% of new jobs in new firms (cfr 12 to 16% in Brazil, Korea, US, and Australia). One third of the world new jobs are created in new firms, but there is no equal distribution across country borders. The UK and Germany are divided on this issue, the UK because of lower welfare arrangements as in the other North-Western European countries? Germany, certainly, because of an East-West divide, as discussed above. Per country some available details are added below.

The French

As Neft (1995) mentioned about Rhone-Poulenc, this chemical giant makes the change of culture as part of its formal personnel planning and succession processes: In their preference of innovation and creativity the French engineers appear to be more interested in pure science than in solving knotty technical problems with less concern about immediate marketability, what the US and UK engineers would have working in this global enterprise. This seems in line with Fayolle's (2000 and the sources he

mentions) that French students would be a lot less interested in self-employment. Entrepreneurs would have a rather negative image in France. This seems in strong relation to the specificities of the French educational system which is very hierarchical and is based on the reputation of the schools. A particularity of the French system is that the “Grandes Ecoles” fulfill a social function. The “Grandes Ecoles” allow the ruling class to reproduce itself, firstly by allowing the transmission of privileges, and, secondly, by organizing a whole series of barriers into the social group. The dominating class, the “Noblesse d’Etat”, as the French sociologist Bourdieu (1989) refers to it, legitimizes its reproduction through an academic meritocracy. Under these conditions, the most important thing, in France, the social recognition and position, does not come from entrepreneurship and from successes in business, but it is mainly related to the graduation from a prestigious French “Grande Ecole”. This gives a cultural explanation to the very low entrepreneurial propensity of the French engineers (Ribeil, 1984). The cultural dimension is useful and relevant to have a comprehensive view of behavioral differences among managers and engineers in the countries. Important research works from d’Iribarne (1993) have put into evidence 3 key behavioral logics among people working in the same international company in 3 different countries: France, U.S.A. and the Netherlands. These logics could explain a wide diversity of entrepreneurial attitudes and behaviors in these countries. France has certainly the weakest entrepreneurial orientation and the Netherlands seems to have a stronger entrepreneurial culture.

The Dutch

In the Netherlands, there is a consistent pattern of business-related practices built around a “consensus” principle (see d’Iribarne, 1993). It is important that decisions are made after everyone has been listened to and if there are disagreements, then there will be searched for a better solution that is agreed on by everyone. In connection with this, a Dutch manager also wants freedom to adopt his/her own approach to the job and for creating personal ideas. A Dutch manager takes his/her tasks serious. “Business is business” and “Business for pleasure” are two Dutch expressions. The orientation of a Dutch manager is short term planning. S/he wants to see results quickly. On the other hand, when the results do not come fast, s/he has perseverance, you almost call it stubbornness. The Dutch engineer is less specialized in a technical area than his/her German colleague. To get technical knowledge the Dutch engineer thinks this to be bought or should develop it him/herself rather than s/he would get it from internal education programs. Still a Dutch manager’s authority is also based on knowledge. The Dutch are more impressed by actions than words. Another point mentioned by Kymper (1992) is the efficient and economic way of managing. The negative side of this way of managing is an urge towards perfection. This leads to rigidity. But again as the French, the Dutch engineers might be less willing to take the risk of trying to be self-employed. A recent internal survey among about 4.000 alumni of two rather management oriented engineering programmes shows that only 3 to 5% work in small companies up to 9 employees and 7% of all Dutch students wish to be entrepreneur (Verhoef, see Ulijn and Fayolle, in prep.). It seems as if lower education levels invite more easily to a start up: the Turkish minority in the Netherlands have more start ups than the average of the majority Dutch population. Here and in other countries low education and less access to high levels of education might just be one reason to start your own business. Less access to mainstream managerial positions and high levels of society might be other ones. Entrepreneurs seem to be ill prepared, run unneeded risks which might explain 75% of the bankruptcy of Dutch firms in 2001 (Blom, see Ulijn

and Fayolle, in prep.). Are the German engineers with less market orientation than the Dutch (see Ulijn, Nagel, and Tan, 2001) more successful in entrepreneurial ventures? An engineer might have to unlearn things as well. Reynolds et al. (2000) found that the influence of education level on entrepreneurship should not be exaggerated as the above example shows!

The Germans

In Germany, there is a consistent pattern of business-related practices around “competence first”. The professional culture of the German engineer is strongly based on this principle. The German apprentice system leads to an exceptionally well-trained work force. About two thirds of German supervisors hold a Master certificate. German managers are chosen for their positions on the basis of their expert knowledge and they consider this knowledge to be the most important basis of their authority. The German engineer finds it self evident that s/he teaches his/her subordinates his/her knowledge and experience. If personnel is highly qualified and they respect their supervisors, there will be little guidance needed. Therefore in Germany the average proportion of staff personnel is less than 30% and this leads to a flat organization. A flat organization has an advantage that new technologies can be introduced easier (also because the personnel has a high level of education). Considering innovation, the German engineers are technology oriented. Marketing is seen as a distraction from the primary goal. To maintain knowledge for innovation German managers think there has to be invested in R&D instead of buying knowledge through acquisitions, joint ventures etc. German managers consider unions and work councils as stabilizing factors. This leads to less time spent on labor disputes. A German manager thinks and acts business like. S/he tries to reduce uncertainties.

To illustrate differences between French, German and Dutch, we give below some results of quick tests we did to assess the profiles of the ideal innovator and the ideal entrepreneur using samples of German and French.

Klaftt and Daum (2001) were able to compare regular 10 industrial engineering, 9 start ups and 48 personnel recruiters (at the annual Konactiva job fair to attract new personnel right on the campus of Darmstadt University of Technology), all in Darmstadt. They did this on the basis of two lists. One profiles the ideal entrepreneur, which has the innovator as one of its 10 basic elements (in an alphabetical order): creative (C), hard worker (H) independent thinker (IT), innovator (IN), leader (L), optimistic (OPT), recognizes/takes advantage of opportunities (OPP), resourceful (RES), risk-taker (RIS), and visionary (VIS). The Ernest & Young survey with Rope Starch Worldwide from 1995 gives the following ideal order: OP, RES, C, IT, H, OPT, IN, RIS, V, L. For Germany the top 3 would be: Visionary, Creative and Independent thinker (48 personnel recruiters), for the 9 start ups it would be: Innovator, Creative/Leader, and for the students: Opportunities user, Visionary and Risk taker. The two orders we could gather for French students (15 Industrial Engineering and 23 Telecommunication) were again different (Ulijn and Fayolle, in prep), but mostly the above top elements were included: OPP, VIS, Creative, Leader (probably was meant: market or technology leader).

The second list uses the HAIRL model explained in Tab. 1 rather assessing the profile of the ideal innovator which the Shell Top Management Team considered to be:

Helicopter view (H), Analysis (A), Imagination and Creativity (I), Reality (R) and Leadership (L) (Trompenaars and Hampden-Turner, op. cit.). Surprisingly the LARIH model for the ideal German innovator by Shell (see Tab. 1) is only partly confirmed by the personnel recruiters, since they mentioned also other elements related more to the entrepreneurial success of the innovation: top 3: Human resources, Innovation and Leadership. Start ups would give A/I, H, and L/R and students: IHARL. Another German set of 31 students (Da Campo et al., 2000) including an association of students willing to start up a venture (JADE) gave AHILR. So leadership seems to be a controversial issue, when it comes to innovation in Germany, may be, because of the confusion about the term: leader of a team or leader in the competitive marketing sense. 19 Dutch civil engineering students gave the following order: IARHL, which differs from the Shell sample: RAHLI. The above two samples of French students gave almost the same profiles: IHARL and IAHRL with imagination and creativity on the top. Comparing all ideal innovator profile sets however, it seems as if the French favor more imagination and creativity in an innovation, that the German prefer the analysis and that Dutch prefer to be realistic on an innovation, again the 3 NCs are complementary.

To conclude this section, we would say an entrepreneurial and innovative engineer as outlined above in Fig. 1 needs a strong interaction with his/her environment, be it within the firms s/he works to be departed from, or once started in the search of partners and a market for his/her innovative idea. We have demonstrated how complicated this picture of networking and cooperating may become, once a European dimension is envisaged. On the other hand the natural and cultural diversity brought in by French, Dutch, and German managers and engineers in start up cooperation, may help to overcome potential hurdles. If it is easier and less expensive to start in France, why not? If Dutch personnel would be more productive, why not using this, for instance for marketing purposes? If a better design and more R&D is needed, why not commit a French engineer to the venture? If the production could be "sourced out" to a group of German engineers, who are good in manufacturing, why not? This way the best of all worlds can be achieved in an entrepreneurial team on the European scene.

3. The European enterprise and its culture: an interaction of national, professional and corporate cultures (NC, PC and CC) within the minds of French, Dutch and German engineers

So far we have seen that a European engineer who wants to start his/her own business faces the effect of his/her NC on his/her perceptions of the ideal entrepreneurial behavior. Da Campo et al. (2000) could not confirm the following hypothesis in their pilot study with Dutch, German, Russian, and Rumanian students.

The cultural differences regarding entrepreneurship are very low. Under similar conditions, individuals belonging to different cultures seem to have a similar perception of entrepreneurial behavior.

The rankings of Trompenaars HAIRL model for Shell varied significantly across those NCs, although this needs further verification in well controlled studies, including the other NCs and population samples, such as start up engineers and business executives (see Ulijn and Fayolle, in prep). This study and others referred above by Reynolds et al. (2000), Blanchflower et al. (2001), and Hofstede et al., this issue, indicate that there is a

lot of latent entrepreneurship across nations, which cannot only explained by NC effects. Mueller and Thomas' study (2000) could relate for 9 countries, ranging from the US, via Slovenia and Croatia to China and Singapore, including Germany NC to personality traits associated with an entrepreneurial potential. What Ulijn and Weggeman (2001) summarized as the ideal innovation culture, a mix of high individualism and low uncertainty avoidance leads to innovativeness and internal locus of control, but those are just entrepreneurial behavior traits. Others might relate to other dimensions of Hofstede, as Nakata and Sivakumar (1996) evidence for innovative behavior. What should be the ideal incubator then for the emerging technology entrepreneur, as outlined by Paffen (see above)? The MNCs and SMEs and even universities or "Grandes Ecoles" which display a CC including low power distance and low uncertainty avoidance, as Ulijn and Weggeman could illustrate, might not only lead to effective innovation inside with the effective intrapreneurship, but also a nice off spring of technical start ups outwards.

Taking Hofstede's cultural development model (2001), we might see a European innovative and entrepreneurial engineer who may grow up in a family business (where a CC comes on the top of his/her NC development at early age), assimilates then through his/her education a certain professional culture (PC). What is this PC which might help or discourage him/her to be an entrepreneur? Both Van der Hart (2001) and Gaillard (2002) suggest that a lot more marketing culture is needed in general industrial and even R&D contexts, the lack of which might hamper cooperation in technical start ups. *The idea is bright, but there is no market for it.* We will now compare for the 3 countries selected how NC, PC and CC may interact in the minds of engineers. The findings of the studies are not comparable on a one to one basis. The French part still has to be replicated for samples of Dutch and German enterprises, because their CCs of MNCs and SMEs (< 500 employees) are not comparable to start ups and small business settings. The Dutch and the German part have to redone within the educational and historical setting of the original French study on a large sample of French engineers originating from the Grandes Ecoles d'Ingénieurs which prevent alumni may be more than in other countries to become entrepreneurial (innovative should be OK!). The managerial of the Dutch might provide a better setting for market aspects, whereas the technical culture of Germany would be a better safeguard for quality. So we have to be partly speculative here! What is needed first is an entrepreneurial culture from which a particular CC of start up may develop, once it is in operation..

Cooperation between start ups in Europe is certainly not a question of only national culture, a merge or a clash between professional and corporate cultures might foster or hamper as well. Entrepreneurial and innovative engineers build up their experiences of such kind through life time based upon the logics outlined in Fig. 1. Our chapter is based upon data from 3 different European countries which includes a survey among French engineers and a case comparison of 12 innovative German and Dutch firms. How does this transition take place in different parts of Europe? How may engineers become successful entrepreneurs through a happy reconciliation of technological and marketing orientations within a given historical context.

In trying to bring some elements to answer the above questions our data reveal interesting things. Obviously, in relation with invention, innovation and entrepreneurship behaviors, we can observe the discriminating character of the

technological dimension for the engineers. Technological dimension is a key one which strongly shapes the career of engineers in France, in Germany and in The Netherlands. But we also know the importance of the market orientation in the innovation process and the influence of cultural variables in the transition from the technological orientation to the market orientation. The transition processes are not similar for German, Dutch and French engineers. One of our previous research, for example, is highlighting one difference between Dutch and German engineers. The Dutch engineer appears to be more market oriented than the German one and his/her transition from a technological orientation to a market perspective takes earlier place. The research suggests the importance of cultural explanations at the corporate and the professional levels.

In France, the social and educational context is still playing a great role in shaping the French engineer attitudes and behaviors. Our survey among French engineers highlights two different profiles of entrepreneurs and two different ways to reach innovation. The “technician” entrepreneur engineer profile is very close to the one of inventor. This type of entrepreneur engineer invents new technologies, new products or new manufacturing processes. He very often needs other competencies (related mainly to marketing, finances and human resource management) to carry out these inventions and to bring them on the markets. One way could be in acquiring these competencies, the other could be to build up an entrepreneurial team. The later is generally the one which is chosen for a lot of reasons, such as time constraint and efficiency or requirements from the financial environment. The second profile, this one of “manager” entrepreneur engineer is very close to the profile of innovator. This type of entrepreneur engineer innovates more or less in the service activities, business to business or business to consumer. He/she has a good ability to manage all the aspects of the innovation process and he/she is particularly interested in and oriented to the market orientation. The “manager” entrepreneur engineer is, therefore, an engineer who succeeds earlier than the “technician” entrepreneur engineer in the transition from the technological orientation to the market orientation. In some cases the transition will not be easy or possible for the later.

Hence, the results of our study show that both “technician” and “manager” entrepreneur engineers are involved in the innovation phenomena. The nature and the processes of innovation are not similar in the two cases, but, both types of innovation are useful for our economies. Under these conditions one main question could be related to the improvement of our understanding about the different forms of using the scientific, technological and managerial knowledge of European engineers in our European societies.

As we are showing, technical culture is a key variable influencing the behaviors of engineers towards innovation and entrepreneurship in Germany, in France and in The Netherlands.

Technical culture (see Harris and Moran, 1996), as it exists in a long tradition of technical expertise (Germany) and the one rooted in a pure science of mathematics and physics tradition (France) might not always be beneficial to an entrepreneurial culture. Meyer and Happaard (2000) argue that elements, such organizational learning, innovation as creating new knowledge, implementing strategic decisions quickly and

increasing speed to the market place and having teams are keys to this. So far the organizational level, start ups rather need an "enterprising" culture related to the person of technology entrepreneur. Kao (1993) defines this as follows:

"Enterprising culture is a commitment of the individual to the continuing pursuit of opportunities and developing an entrepreneurial endeavor to its growth potentials for the purpose of creating wealth for the individual and adding value to society".

It is obvious that such an entrepreneurial endeavor needs cooperation between the start up and the actors of its environment.

4. How to foster cooperation between European start ups for a better enterprising and innovative culture.

Finally this chapter addresses the question how to foster cooperation between European start ups for a better enterprising and innovative culture. Research projects aiming at this issue, might start as comparing national entrepreneurship phenomena, such as suggested partly by Lichtenberger and Naullean (1993) and Trompenaars and Hampden-Turner (1999), followed by studying cooperation, networks and alliances (Aliouat, 2000) including globalization (Birley and Stockley, 1998) and the heterogeneity of teams, for instance by mixing marketers and engineers (Bantel and Jackson, 1989, Geletkanycz and Hambrick, 1997, and Shaw and Shaw, 1998). Cooperation requires more mobility. Within the European Union, the individual member states face rather an influx of economic refugees (who might create excellent start ups, by the way) than that they can welcome an invasion of entrepreneurial and innovative engineers from another member state. Which French engineer would like to start a business with a German colleague who could implement his idea perfectly? Which German engineer seeks a market-oriented partner in Britain or The Netherlands (NL) to fulfil his dream of a successful start up? Which Dutch engineer looks for technology entrepreneurship in France and vice versa? It seems as if new virtual borders prevent start ups also to cooperate. That is why this chapter presents a summarizing model of a new cultural identity of Europe based upon Entrepreneurship, Innovation and Mobility using the onion culture metaphor by Hofstede and Schein (both 1991) to increase the mobility of the European engineer (Ulijn and Gould, 2002). A new culture is needed to foster the cooperation between high, low and other tech start ups to facilitate a genuine European technology entrepreneurship.

The above outline of an enterprising and innovative culture pinpoints apart from a low power distance (PD) and uncertainty avoidance (UA) for the initiation of the innovation (Nakata and Sivakumar) and a low uncertainty avoidance (Mueller and Thomas) for entrepreneurship. This does not mean that countries with high PD and UA do not create self-employment. As Hofstede et al. this issue shows dissatisfaction with bureaucracy, poverty and corruption might be a strong incentive for entrepreneurship. Most of those countries (East Asia, South America and Africa) are very collectivistic and have tight cultures (Triandis) with high context/implicit communication (Hall). A lot of knowledge and experience are constantly shared and do NOT have to be explicitly stated and spelled out over and over in a very explicit way (see Ulijn and Kumar). It seems as if cooperation in such settings with natural teaming up and group solidarity, could be very beneficial to entrepreneurship. On the other hand high PD and UA and a

high collectivism foster the implementation of the innovation. Since neither France, nor NL or Germany have a high collectivism, cooperation might not be a given fact. On the one hand high individualism might lead to entrepreneurship in the countries compared by Muller and Thomas, on the other hand cooperation would have to be learned in those situations. This might be easier in the technical culture of the well-oiled machine in Germany than in a bureaucratic French culture, with the Dutch managerial culture in the middle. What ways of cooperating between start ups may be suggested?

International comparisons of entrepreneurship, such as the ones on the basis of HAIRL (Trompenaars and Hampden-Turner, 1999) and for the South Pacific and South-East Asia (Dana, 1999 and 2002) might break away potential hurdles for international cooperation, in particular if a start up has the market in the other country as a focus or opportunity. Although the concept of global entrepreneurship (Birley and MacMillan, 1997) does not imply yet such true international comparison, the surveys of studies by Birley and others (for instance, Birley and Stockley, 1998) and Ulijn and Weggeman, 2001) suggest a lot of ideas for an ideal composition of entrepreneurial and innovative teams. Important factors here are heterogeneity vs homogeneity (Bantel and Jackson, 1989) and Geletkanycz, and Hambrick, 1997), team size, the cooperative setting of an incubator or clan (Ouchi), of loose vs tight groups (Triandis), and the need of conflict resolution (using the work by Jehn). Job satisfaction fuels those team processes at project level (Nerkar et al., 1997).

Intercultural countries could learn from each other. If high PD and UA works better for efficient implementation of an innovation, why not have French work with Germans to combine the best of some worlds. If the low masculinity score of the Dutch is beneficial to creativity, why not having them together with a French colleague to design an innovation in one entrepreneurial team? But NC is not the only cultural factor in international teams, also in national teams a possible clash and conflict between engineers and marketers (Shaw and Shaw, 1998 and Ulijn et al., 2001) might be transformed into an asset for effective cooperation in design and innovation with the client, as Van Luxemburg et al. (2003) show in 5 Dutch cases. They suggest that engineering culture, for instance, might be high context, implicit, and tight (*we, as inside experts, know what we are talking about*), where marketing culture would be much more open (low context) and tend to exchange explicit messages with customers. The right mix of professional cultures might be essential for effective cooperation between start ups. Of course, cooperation can take on some standardized and structural forms, such as the different ways of strategic alliancing, joint ventures, mergers, acquisitions, once a start up has come to some maturity. In a study of 60 technological alliances between French firms it appeared that entrepreneurs might start with simply saving transactions costs, but end up with sharing a lot of crucial knowledge sources essential for new start ups (Aliouat, 2000). Of course, such collaboration, as for instance in French-German joint ventures, create conflicts, but also synergy, once the right mutual perception leads to effective problem solving (Lichtenberger and Naullea, 1993). NCs might also network differently. A study by Burt et al. (2000) indicates that the social capital of French managers differs from that of American ones. The French are anchored in long-standing personal relationships to which they add recent acquaintances from work. The American do the opposite adding personal to work. This has implications for cooperation between French and American/Dutch/German start ups, the American behavior being similar to those of Dutch and Germans. As Brown in

this book and Gwynne (1997) indicate a special culture of skunks is needed to look for start up opportunities, which requires the mobility of that animal.

Van Gorp et al. (2002) report on several sources that show that the mobility of scientists and engineers is the biggest in the US, where they change jobs every 4 years (OECD, 2000). In Japan only 20% do so over lifetime. The EU is short of internal mobility and risks a brain drain towards the US, which is a constant threat to its internal economy, as has been already mentioned in an early NATO study (1982). Lack of transferability of pensions between public and private sectors and between member states might cause such lack of mobility and job change. On the basis of an inquiry among 40 European advanced students of engineering and 5 Members of the European Parliament (MEPs, members of the Commission on External Trade, Industry, Research and Energy) on the causes of this issue and how to take measures to make the EU more competitive for entrepreneurship and innovation, Ulijn and Gould (2002) propose a new cultural identity for Europe, that of Entrepreneurship, Innovation and Mobility (see Fig. 2).

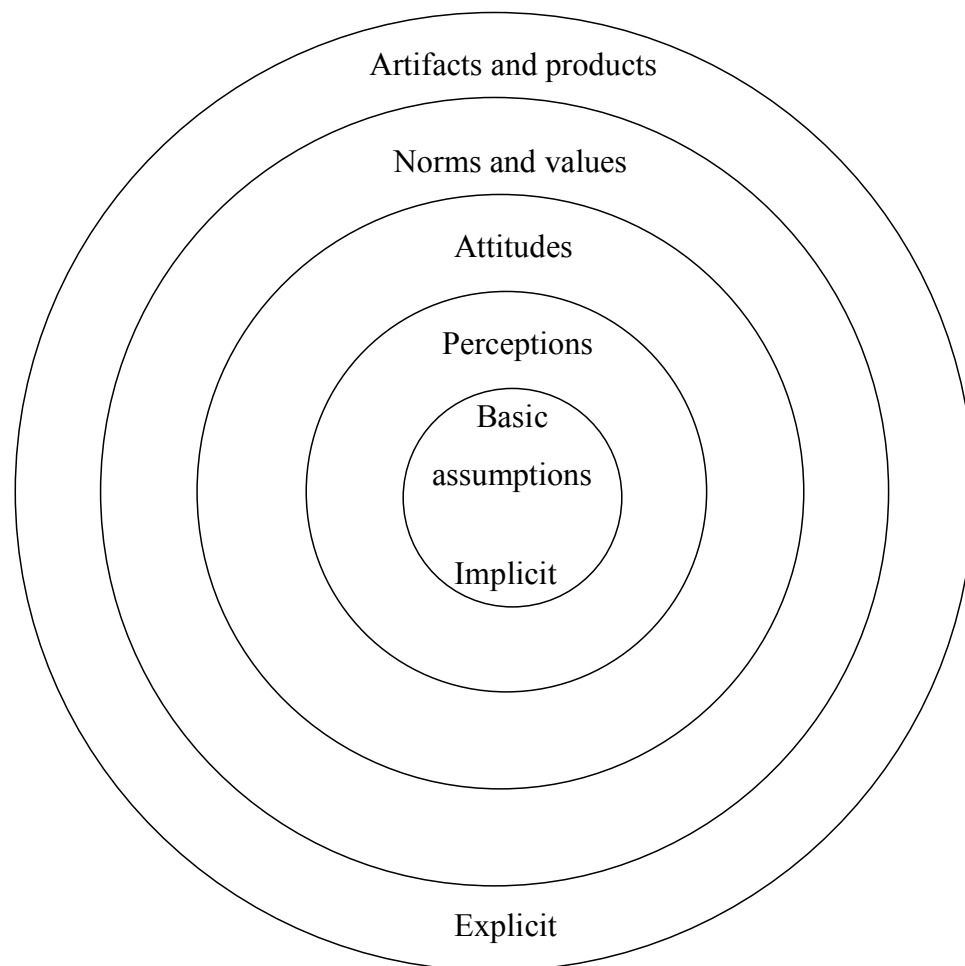


Fig. 2: A new cultural identity of Europe: Entrepreneurship, Innovation and Mobility (EIM), source: The onion model (based on Hofstede and Schein, both

1991) from Ulijn and Gould (2002)

The onion metaphor of the different layers of artifacts and products (explicit) towards the implicit inner core of the basic assumptions is used to illustrate to show that, once engineers would feel more as European innovative entrepreneurs, they would develop norms and values towards that mobility having the right perceptions of the complementarity of their partners from other EU member states. Cooperation between start ups across the state borders might then be as easy as in the US. A *condition sine qua non* for this, would be, however, that both the European Commission and the European Parliament would adopt that appropriate regulations in the outer layer of the onion as well to protect and foster the inner layers of this mobility culture. Both students (future entrepreneurial and innovative engineers?) and MEPs agreed upon the need of such regulations and culture.

To be more concrete, we would like to develop a bit, as an example, a proposed CLUSTER program initiated by Eindhoven University of Technology (ECIS: Eindhoven Center of Innovation Studies) and INP Grenoble (EPI: Entrepreneurship and Process of Innovation). In order to promote and stimulate a better enterprising and innovative culture in Europe, this cooperation program is developing some initial and key measures.

One of the academic measures to take will be a joint CLUSTER PhD-training program for Entrepreneurship and Innovation (Taskforce VI), an initiative of ECIS and EPI. The hope is then that some cooperation between start ups between the best universities of technology in Europe would naturally happen.

A second academic measure is to organize each year as part of the above, a European conference on entrepreneurship and innovation research. The first conference, "Entrepreneurship research in Europe: specificities and perspectives", will be held in September 2002 at Valence (France). The second one could be organized in the Netherlands at Eindhoven. The aim of this conference is to highlight the European particularities in the field of research in entrepreneurship and innovation. For instance, concerning entrepreneurship, we are dealing with these topics:

- Teaching of entrepreneurship: theories, practices and main effects
- The study of entrepreneurial processes: why, what and how?
- Theories in the field of entrepreneurship
- Innovative methodologies in the study of entrepreneurship phenomenon
- High-technology, innovation and entrepreneurship
- Frontiers of entrepreneurship and relationship with other scientific fields

The two first measures try to set up structures and framework for training, exchanging ideas and research materials around entrepreneurship and innovation at the academic level.

A lot of more classical measures will take place in the cooperation program such as the PhDs joint supervision, the exchange of people (teachers, researchers, students, etc.) within the European network, the design of joint research project and also the development of a strong relationship with the professional world of innovation and entrepreneurship in each country of the CLUSTER group.

5. Conclusions and implications for business practice

Across the EU it is striking, however that most countries in Northern Europe (including the Benelux) prefer the employed status with the exception of Ireland, which together with the Southern/Latin countries prefer to be self-employed. This finding and that of France contradicts the recent survey by Reynolds et al. (2000), where those two country present only 2 to 3% of new jobs in new firms (12 to 16% in Brazil, Korea, US, and Australia). The UK and Germany are divided on this issue, the UK because of lower welfare arrangements as in the other North-Western European countries. Germany, certainly, because of an East-West divide, as discussed in this chapter. A lot of things need to be done to explain these differences between countries and also to identify the main factors which are playing a role. Our research is certainly bringing some answers to the key questions we asked in the introduction part.

If we look at the national culture level, in the development of a strong entrepreneurial orientation, the Dutch culture would then be ideal, with the German next and the French in the last position, but for the implementation of the innovation a high power distance, masculinity, and uncertainty avoidance and a low individualism would work better. On those scores the ideal order would be the opposite: France, Germany, The Netherlands. If we make a plea in this chapter for more cooperation and teamwork which is particular required to make the start up really a success in the long run, the 3 countries combined would warrant an ideal European start up! (let the French design, the German implement and the Dutch sell?)

Regarding the ideal profile of the innovative entrepreneur (RQ 8) the 3 countries might cooperate again in a complementary way: all agree on analysis as a sound base of technology entrepreneurship in the second place, but the French give priority to imagination and creativity, the Dutch are realistic and the Germans need some leadership in an entrepreneurial team. Comparing all ideal innovator profile sets however, it seems as if the French favor more imagination and creativity in an innovation, that the German prefer the analysis and that Dutch prefer to be realistic on an innovation, again the 3 national cultures are complementary.

We were able to interpret our data according to new "cultural" lines based upon Nakata and Sivakumar (1996), Hofstede (2001) and Ulijn and Weggeman (2001). Cooperation between start ups in Europe is certainly not a question of only national culture. A perfect innovation culture seems to merge not only at the national level, but should match perfectly the professional culture of the European engineers and the corporate culture of their firms (start up, SME or MNC) researched.

An entrepreneurial and innovative engineer as outlined in this chapter needs a strong interaction with his/her environment, be it within the firms s/he works to be departed from, or once started in the search of partners and a market for his/her innovative idea. We have demonstrated how complicated this picture of networking and cooperating may become, once a European dimension is envisaged. On the other hand the natural and cultural diversity brought in by French, Dutch, and German managers and engineers in start up cooperation, may help to overcome potential hurdles. If it is easier and less expensive to start in France, why not? If Dutch personnel would be more productive,

why not using this, for instance for marketing purposes? If a better design and more R&D is needed, why not commit a French engineer to the venture? If the production could be "sourced out" to a group of German engineers, who are good in manufacturing, why not? This way the best of all worlds can be achieved in an entrepreneurial team on the European scene.

Should French engineers design the technical innovation, their German colleagues implement it into a well-controlled manufacturing process and the Dutch, for instance, sell to the market, as they are often positively stereotyped? Our research suggests that diversity might already be built in systematically in a cross-border innovation team as a competitive asset and not as something which happens to us as a handicap on the European and global scene. Cooperation between start ups within a across countries may serve as a key example of this. Our earlier plea for a European development of technology management beneficial to both high tech enterprises and engineering education has obvious implications for the position of French, Dutch, and German entrepreneurial and innovative engineers in such cooperation of start-ups (Fayolle et al. (2002).

We are conscious, at the end of our exploratory work, that few things have been done concerning this key topic which is the cooperation between European technological start ups. More research is needed with adequate sampling in each of our three countries. Research projects could have a focus on the cultural aspects and have as a main objective the test of hypotheses we have elaborated. Other projects could use a longitudinal approach to study the how questions related to the foundation and the development of technological start ups in France, Germany and the Netherlands. At a theoretical level, depending on the type of research project, the network theory and the resource-based theory could be of interest to develop scientific knowledge about the potential of cooperation between technological start ups in Europe.

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